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ECLOGÆ BOTANICÆ, NO. 2.

BY EDWARD L. GREENE.

1. SOME NEW WESTERN PLANTS.

Trifolium truncatum.

T. amplexens Greene, Pitt. I, 6, not of Torr. and Gray.
T. stenophyllum Greene, Fl. Fr., 34, partly, not of Nutt.
T. Franciscanum var. *truncatum* Greene, Man., 100.

Annual, 5 to 10 inches high, branching from the base, slender, flaccid when young, the branches and peduncles wiry in age; herbage vivid green and glabrous: lowest leaflets broadly cuneiform and truncate, less than $\frac{1}{2}$ inch long, the upper larger and ampler, 1 inch long, oblong-cuneiform or oblong-linear, truncate or obtuse, often retuse, not manifestly venulose, sparingly toothed: very slender peduncles exceeding the leaves: heads subglobose, about $\frac{1}{2}$ inch in diameter when mature: corolla yellowish-white, tipped with dark purple, the tube at length inflated to the broadly obpyramidal and truncate, except as abruptly pointed by the withered remains of the tips of the petals.

This, one of the most common clovers of the middle California inland districts, I was long unable to believe to be an unrecognized species; and, as the bibliography shows, I have made repeated efforts to reconcile it with one and another of the poorly described species of Nuttall. Then, at last, in the *Manual of Bay-Region Botany*, I made it a part—a named variety—of what I thought must be a new species; but, within a few months from the time of publishing *T. Franciscanum*, I was privileged to see, in the Herbarium of the British Museum, the type specimen of Nuttall's *T. stenophyllum*; and I was surprised to discover, in that type, just what I had taken as the type of my own *T. Franciscanum*. From that type, a common species of the seaboard districts, the present plant is very distinct. The name *truncatum* is adopted for the species in allusion to the very broad and flat-topped bladdery-inflated corolla-tube, rather than to the form of the leaflets, which, however, are very commonly truncate also.

Trifolium lilacinum.

Annual, flaccid, the erect or merely decumbent branches 6 to 10 inches high: herbage apparently glabrous, but the growing parts more or less hirsutulous under a lens: lowest leaflets obovate, the upper oblong, or elliptic-lanceolate, minutely spinulose-serrulate: peduncles elongated, far surpassing the leaves and somewhat scapiform: hemispherical and amply involucrate heads $\frac{3}{4}$ inch broad; involucre of 8 or 10 obovate broad and somewhat overlapping laciniately cleft lobes; subulate-setaceous and plumose calyx-teeth about as long as the campanulate thin and scarious 5-nerved tube: corolla $\frac{1}{2}$ inch long, of a rich deep lilac-purple tipped with pink or white.

A most beautiful ally of *T. barbigerum*, and of apparently quite limited range; but it is common on the lower slopes of one or two hills at South San Francisco, Cal., and has been collected once by Mr. Bioletti and once by myself on the eastern side of the bay still further southward.

Trifolium rostratum.

Annual, glabrous, very slender, diffuse, dwarf, the branches only 2 or 3 inches long: stipules rounded, spreading, lacinate: very slender petioles elongated; leaflets cuneate-obcordate, only $\frac{1}{4}$ inch long, evenly and acutely serrate-toothed: peduncles exceeding the leaves; involucre small but manifest, about 4 or 5 lines wide, lobed and lacinate: head less than $\frac{1}{2}$ inch broad, rather few-flowered: calyx-teeth longer than the subcampanulate tube, oblong-ovate, tapering to a rigid aristiform apex: corolla purple, tipped with white, the keel with a long beak-like apex at least a third as long as the body.

A species of quite remarkable floral structure, collected only by Mr. V. K. Chestnut, at Lake Merritt, Oakland, California, 1889; at that time referred by me (Fl. Fr., 30), with much hesitation, to *T. appendiculatum*.

Boisduvalia diffusa.

Much branched from the base, the slender, wiry, white and shining sparingly leafy branches 8 to 12 inches long, very decumbent or almost prostrate, and, with the leaves, sparsely hirtellous when young, mostly glabrate in age: the scattered leaves, ovate and oblong-ovate, and ovate-lanceolate, $\frac{1}{4}$ to $\frac{3}{4}$ inch long, all sessile, and all, even the lowest as well as the uppermost, with a flower in the

axil; petals about a line long, bifid, deep red-purple: capsule about 4 lines long, of oblong-lanceolate outline, curving outward, about 50-seeded: seeds dark brown, glabrous, somewhat angular, and of subclavate-oblong outline.

Dry bed of the upper Humboldt River, near Deeth, Nevada, Aug. 5, 1895.

Valerianella magna.

Glabrous, the stout stems sharply angular, 3 to 5 feet long, tortuous, half-reclining on fences or among bushes, and with rather many small axillary branches: cymes thyrsoidly congested at the ends of the stem and branches: corolla white, bilabiate, with ample funnel-form tube and a short thick spur: fruit glabrous externally, triquetrous-ovoid, the ventral concavity formed by the ample wings closed below, open above, the wings themselves strongly hispid-ciliate within.

Collected only by the author, in Knight's Valley, Sonoma Co., Cal., June, 1894. Species noteworthy on account of its great size and half-climbing habit; the fruit showing an affinity with *V. aphanoptera*.

Valerianella ciliosa.

Slender, erect, simple, seldom a foot high, corolla small, deep pink, very distinctly bilabiate, the rather slender and tapering spur much longer than the body and produced far below the ovary: fruit of roundish outline but modified by a very prominent stout apiculation, the back glabrous, provided with a very broad ribbon-like though distinctly bevelled keel, which is very densely ciliate along both margins, the subrostriform apiculation bearing similar hairs, the turgid-margined abruptly inflexed wings revealing the ventral cavity by an elliptic acute opening.

Plentiful on northward slopes of low hills west of Napa Valley, California, growing with *V. macrocera*; but very distinct, no less in fruit characters than in form of corolla.

Lessingia pectinata.

Slender and very diffuse, the ascending or more widely spreading and almost prostrate branches a foot long or more; herbage scarcely woolly even when young, green, sparingly stipitate-glandular and scabrous throughout; only the lowest leaves woolly, these and also those of stem and branches pectinate-pinnatifid, the segments pinn-

gently spinescent-tipped: involucre bracts narrow, acute, glandular-puberulent: corollas yellow.

Species known only from Monterey, California, where it has been collected in recent times by Parry, Pringle, Tidestrom and others, but earlier, as shown in the herbarium at Kew, by Hartweg: In the American herbaria it is found mixed sometimes with *L. germanorum*, sometimes with *L. glandulifera*.

***Pyrocoma eriopoda*.**

Caudex ligneous, covered with a dense white wool connected with the bases of the petioles of the oblong lanceolate obtuse coarsely toothed coriaceous glabrous or minutely scabrous leaves; stem erect, rigid, 1 to 2 feet high, with a few ascending or suberect branches; cauline leaves spatulate, the rameal ovate, acute, remotely serrate, less than 1 inch long: heads solitary on the ends of the branches and in the axils of the leaves; involucre turbinate-campanulate, about $\frac{1}{2}$ inch high; bracts very rigid, oblong linear, green throughout, but more herbaceous at the erect pungently acute apex: rays 15 to 20, not showy.

Collected at the Soda Springs, Esmeralda County, Nevada, July, 1888, by Mr. Shockley.

***Pyrocoma solidaginea*.**

Stems rather stout, decumbent, 12 to 18 inches high, lanuginous-tomentose throughout, but the leaves, and often all but the base of the stem glabrate at maturity: radical leaves lanceolate, on rather slender petioles, 2 to 5 inches long, entire or irregularly serrate, abruptly acute; cauline spatulate, sessile by an auriculate-clasping base: stem parted at the middle or toward the base into numerous slender suberect branches bearing numerous racemosely disposed, small heads: involucre campanulate, $\frac{1}{4}$ inch high; bracts imbricated loosely in about 3 series, linear, or oblong-linear, the green-herbaceous erect tips pungently acute: rays 12 to 18, small, light yellow.

Along the Humboldt River, at Palisade, Nevada, 24th of July, 1893. Species much resembling a *Solidago*; the small heads not rarely numbering as many as seventy-five on a single stem.

***Pyrocoma subviscosa*.**

Stems not rigid, 14 to 20 inches high, only slightly decumbent: leaves, upper part of stem, and the inflorescence glandular-puberu-

lent and resinous-viscid: leaves not in the least degree coriaceous; radical 6 or 8 inches long, lanceolate or linear-lanceolate, very acute, saliently and sharply serrate-toothed; the sessile cauline ones more strongly toothed and the teeth spreading: heads only 3 to 5, corymbose at summit of the stem: involucre broadly hemispherical, $\frac{1}{4}$ to $\frac{3}{4}$ inch broad; bracts linear-lanceolate, acute, in about 3 not very unequal series, herbaceous almost throughout except the innermost: rays 30 or more, showy.

Near the Humboldt Wells, in eastern Nevada, 25th of July, 1893. To be compared only with *P. lanceolata*, from which it differs most notably in the membranaceous texture of the whole plant as well as in the fine close glandular indument.

Aster militaris.

Rigidly erect, 1 to 1½ feet high, equably leafy and simple up to the somewhat fastigiately corymbose panicle: leaves 2 or 3 inches long, scabrous-puberulent on both faces, and with scabrous-ciliolate margins, midvein prominent, lateral nerves none, the upper cauline lanceolate, very acute, mucronate by the excurrent strong midvein, tapering to a narrow half-clasping base, entire or obscurely serrate-toothed: involucre turbinate, the oblong-linear obtuse bracts numerous and much imbricated, green-herbaceous along the midvein and at tip, pubescent, appressed; rays numerous, pale-purplish: achenes sparsely pubescent: pappus not copious, rather fragile.

A well-marked species of genuine *Aster*, but not intimately related to any other known. Obtained at Grant's Pass, in southern Oregon, September, 1892, by Mr. Howell.

Aster amplissimus.

Erect, rather slender, 1 to 2 feet high, simple up to the summit, then parting into 3 or more pedunculiform short branches, each bearing a single very large head; stem red, bearing more or less white hirsutulous pubescence, this often running somewhat in lines, or on one side only, except under the heads, when it is denser: leaves all ample, thin, entire; the radical 8 to 12 inches long, oblanceolate, tapering to a slender winged and ciliolated petiole; cauline few and remote, from somewhat spatulate-lanceolate to linear-lanceolate, acutish, sessile by an auriculate-clasping base: heads $\frac{1}{2}$ inch high, more than 1 inch broad; bracts from oblong- to linear-lanceolate, acute, in 2 series but subequal, the outer series quite herbaceous, not

spreading, bristly-ciliate, otherwise glabrous: rays large, rose-red or purple: achenes sparsely strigose; pappus firm.

In wet subalpine meadows, toward the limit of trees on Mt. Reinier, Washington; collected by the writer, 21st of August, 1889; probably not rare in the higher Cascades, and possibly forming a part of the confused *A. foliaceus* var. *frondeus* of Gray's *Synoptical Flora*, but very distinct from the type of that variety, which belongs to a different region.

Aster frondeus.

Aster foliaceus, var. *frondeus* Gray, Syn. Fl., I, Part 2, p. 193, in part only.

Stems stoutish, decumbent, 1 to 2 feet high, green and nearly glabrous, mostly simple up to the summit and bearing a solitary head, or two or more on very short peduncles: leaves not thin, glabrous except the scabrous-ciliolate margins, entire; radical obovate-oblong, petiolate; cauline spatulate; acutish, 2 to 4 inches long, auriculate-clasping: heads rather more than $\frac{1}{2}$ inch high, twice as broad: bracts of involucre of about equal length, the outer ovoid or oblong and amply foliaceous; inner more spatulate, but herbaceous almost throughout: rays $\frac{1}{2}$ inch long, light blue or purplish.

Plant of the Rocky Mountain region in Colorado and Utah, thence northwestward to the borders of California and perhaps Oregon; inhabiting middle altitudes; its habit much like that of *Solidago Parryi* (*Aplopappus Parryi* Gray), but heads few or solitary.

Vagnera pallescens.

Rather slender, horizontally inclining (not erect), 2 or 3 feet high, the whole plant of a pale glaucous-green, but not glabrous: leaves sessile, ample, ovate-elliptic, obtusish, or with abrupt short apiculation, thin and widely spreading, 4 to 6 inches long, nearly glabrous above, rather stiffly hirtellous beneath: panicle of racemes rather open, 4 to 6 inches long: flowers white, very fragrant: berries deep cherry-red.

Species inhabiting higher than middle elevations of the California Sierra, from at least Fresno Co., northward: very unlike the stout erect upright-leaved bright green *V. amplexicaulis* of lower altitudes, and of more northerly range, to which it has been referred.

2. REVISION OF TROPIDOCARPUM.

To the knowledge of this very noteworthy genus of plants, as it was published by Sir William Hooker almost sixty years since,

nothing new was contributed until within the last decade. It was, indeed, as recently as the year 1888 that, in a peculiar district of the Californian territory, I discovered a very clear, new species, presenting fruit characters so precisely conformed to those of some capparids, that I at once published the species as *T. capparideum*; and still more recently a third species has been detected by Dr. A. Davidson, in southern California, and published by him under the uncomplimentary name of *T. dubium*.

On my return from Europe a year ago, having seen and carefully examined not only Hooker's type specimens, but also other valuable and instructive materials at Kew, I was ready to give, and had hoped to have written before this, what is still much needed, a critical revision of the species.

This generic type is altogether Californian, none of the species ranging eastward beyond the western foothills of the Sierra Nevada, or extending northward beyond the valley of the upper Sacramento; though to the southward one has been found as far beyond the State boundary as San Quentin on the peninsula of Lower California.

From almost all known cruciferous plants, and from all other American cruciferæ, these differ notably, and very constantly, in their leafy, or at least leafy-bracted inflorescence; a character which they have in common with all capparids; and, if the remarkable *T. capparideum*, with its ample bladdery and wholly partitionless pod, dehiscing from the apex rather than from the base, had been the type of the genus, one might say that the seeds alone favor the retention of it within the order of Cruciferæ, all other less essential characters being those of the Capparidæ.

By some error, either of Mr. Bentham's pen or of the printer, the number of species of *Tropidocarpum* is given, in the *Genera Plantarum*, as six, instead of one, or at most two; for at the time that work was published only the two original Hookerian species had been published, and even of these, one was beginning to be looked upon as of questionable validity.

Although the plants vary considerably in mode of growth, pubescence, etc., the pods are of such diversity as to render it impossible that any botanist should treat the species as one only; and, if not one, simply, no less than four must, in all consistency, be recognized. These may be characterized essentially as follows:—

T. gracile Hook., Ic., t. 43; Torr. and Gray, Fl., I, 94; Greene, Fl. Fr., 278, and Man., 27.

Pod 1 to $1\frac{1}{2}$ inches long, lance-linear to linear, strongly obcompressed throughout, the cross-section nearly or quite linear; partition extremely narrow, but apparently never wanting; seeds in one row, filling each narrow keel-like valve, in outline somewhat quadrately oblong, black.

T. macrocarpum Hook. and Harv. in Herb. Kew. “? *T. dubium*” Robinson, in Gray, Syn. Fl., I, 141, ex descr., but not as to Davidson’s type. *T. gracile*, var. *scabriusculum*, Greene, Fl. Fr., 278, and Man., 27, partly, but not *T. scabriusculum* Hook.

Pod $1\frac{1}{2}$ to 3 inches long, narrowly linear (often little more than $\frac{1}{2}$ line wide), very flatly obcompressed throughout, or occasionally the lower $\frac{1}{4}$ or $\frac{1}{2}$ as flatly compressed laterally, this part destitute of partition, but the upper division obviously partitioned: ripe seeds unknown.

T. dubium Davidson, Eryth., II, 180.

Pod $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, lance-linear, 1 line wide, the cross-section distinctly and rather sharply rhombic, either 1-celled throughout, or the upper $\frac{1}{2}$ or $\frac{1}{3}$ obcompressed and partitioned: seeds half as large as in *T. gracile*, dark brown, obovoid.

T. capparideum Greene, Pitt., I, 217; Fl. Fr., 278; Man., 27; probably “? *T. capparideum*,” Robinson, l. c.

Pod oblong, or linear-oblong, about $\frac{3}{4}$ inch long, slightly obcompressed, the cross-section elliptic-oblong, partition wholly wanting; valves 4, but two narrower than the others and more persistent: seeds in 4 rows.

The first of the above species is the most variable one, being usually erect and simple, with little pubescence, the pods without any. In a more freely branching state, with abundant rather harsh pubescence, it is *T. scabriusculum* Hook., though not what I formerly so considered; and I find the transition from typical *T. gracile* to this so numerous, and the distinction so slight, that I should hardly concede to the latter even varietal rank.

The second species, *T. macrocarpum*, hitherto unpublished, is what I had mistaken for *T. scabriusculum*; and it was at Kew that I discovered my error, where I found this very distinct species indicated as a new one, in the handwriting of Harvey, with the above name assigned it. Dr. Davidson, of Los Angeles, included it

in his *T. dubium*, but it is very different from the type of that species in its pod.

The third species, Dr. Davidson's *T. dubium*, as to the typical plant, is an excellent one by the sharply rhombic cross-section of the short pod. In the only specimen of his which I have access to, there is no instance of that twist in the pod which he assigns to the species; whence I infer that he has included in it, the preceding; but the essential character of that is its extremely long and narrow very flat pod.

The fourth species, *T. capparideum*, is such a remarkable connecting link between two or three distinct natural orders, that herbarium botanists of the old school would naturally sit more at ease if such a plant had not been discovered. It has invariably a 4-valved pod and 4 placentæ. The valves separate from the placentæ beginning at the top, just as in the capparids; and when all four of the valves have fallen away, the four placentæ, joined together at the summit, remain in place, quite as in certain genera of Papaveraceæ. The pods are constantly devoid of every trace of a partition, and there is not the least suggestion of anything anomalous about the plant. In its locality it is even more abundant than any other species, and less disposed to vary than is the typical species of the genus. The statement in the *Synoptical Flora*, p. 141, as to the capsules, "commonly containing a small capsule-like structure at base," it is based on a single instance. Dr. Robinson's imagination would seem to have led him to guess that this malformation may be common. I alone have seen more of this plant than have all other botanists, by at least tenfold, and am prepared to say that no species of the genus is less variable in its fruit, or more constant in all its excellent specific characters.